

**THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE  
PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:**

- 5    1. A Moineau stator, comprising:  
        a tube (10) having lobes (3) arranged in a  
configuration which is adapted to interact with a rotor and  
formed through a hydroforming process.
- 10   2. The Moineau stator as defined in Claim 1, wherein the  
tube (10) has an elastomer coated interior (4) adapted to  
form a liquid seal with a rotor.
3. The Moineau stator as defined in Claim 2, wherein the  
15   elastomer (4) is of uniform thickness.
4. The Moineau stator as defined in Claim 1, wherein the  
tube (10) is thin walled and is surrounded by a supporting  
structure (201).
- 20   5. The Moineau stator as defined in Claim 4, wherein the  
support structure (201) is a support housing.
6. The Moineau stator as defined in Claim 5, wherein the  
25   support housing (201) is cylindrical.
7. The Moineau stator as defined in Claim 5, wherein the  
support housing (301) has lobes.
- 30   8. The Moineau stator as defined in Claim 5, wherein one of  
an exterior surface (6) of the tube (10) or an interior  
surface of the support housing (301) is coated with  
elastomer.
- 35   9. The Moineau stator as defined in Claim 5, wherein

discrete pressurized axial cavities (203) are positioned in an annulus (202) between the tube (10) and the support housing (201) and means (206) are provided to equalize pressure in the axial cavities (203) with pressure within  
5 the interior (5) of the tube (10).

10. The Moineau stator as defined in Claim 9, wherein the means to equalize pressure includes fluid passages (206) allowing fluids from the interior (5) of the tube (10) to  
10 communicate with the axial cavities (203).

11. The Moineau stator as defined in Claim 2, wherein there is an unequal preferential axial distribution of elastomer coating (4) at intervals along the length of the tube (10).  
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12. The Moineau stator as defined in Claim 2, wherein there is an unequal preferential circumferential distribution of elastomer coating (4) at intervals along the circumference of the tube (10).  
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13. The Moineau stator as defined in Claim 1, wherein the tube (10) is placed into a hydroforming fixture (100) and formed to have lobes (3), arranged in a configuration which is adapted to interact with a rotor, through a hydroforming  
25 process.

14. The moineau stator as defined in Claim 4, wherein the support structure is a rigid support housing (201) having walls able to resist pressure, torque, and axial loads  
30 experienced in its intended operating environment, and the tube (10) is deformable supported within the support housing (201), the tube (10) having an interior surface (5), an exterior surface (6), lobes (3) arranged in a configuration adapted to interact with a moineau rotor and walls (2) that  
35 are sufficiently thin as to be subjected to elastic

deformation in response to interfacial seal forces imposed by interference with the rotor; and

means are provided for supporting the tube (10) within the support housing (201), including means for balancing  
5 pressure acting on the interior surface (5) of the tube (10) with a substantially equal pressure acting on the exterior surface (6) of the tube (10) such that the deformation of the tube (10) in response to pressure variations is limited while the wall of the tube (10) remains compliant to  
10 facilitate the tube (10) tracking movement of the rotor.

15. The Moineau stator as defined in Claim 14, the means for supporting the tube (10) and balancing pressure being a filler (202A) in the annulus 202.

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16. The Moineau stator as defined in Claim 15, the filler being a compliant but relatively incompressible solid.

17. The Moineau stator as defined in Claim 15, wherein an  
20 annulus (202) between the tube (10) and the support housing (201) is filled with elastomer, thereby balancing pressure acting on the interior surface (6) of the tube (10) with a substantially equal force acting on the exterior surface (6) of the tube (10) such that the deformation of the tube (10)  
25 in response to pressure variations is limited.

18. The Moineau stator as defined in Claim 15, wherein an  
annulus (202) between the tube (10) and the support housing (201) is filled with fluid, thereby balancing pressure  
30 acting on the interior surface (5) of the tube (10) with a substantially equal pressure acting on the exterior surface (6) of the tube (10) such that the deformation of the tube (10) in response to pressure variations is limited.

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19. The Moineau stator as defined in Claim 14, wherein the support housing (301) has lobes arranged in a configuration adapted to interact with the lobes on the tube (10), thereby balancing pressure acting on the interior surface (6) of the tube (10) with a substantially equal pressure acting on the exterior surface (6) of the tube (10) such that the deformation of the tube (10) in response to pressure variations is limited.